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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/077,554	02/15/2002	Chad A. Cobbley	MTI-31591	3265
22202 7590 11/15/2010 WHYTE HIRSCHBOECK DUDEK & C INTELLECTUAL PROPERTY DEPARTMENT 555 EAST WELLS STREET, SUITE 1900 MILWAUKEE, WI 53202				
EXAMINER				
TRINH, HOA B				
ART UNIT		PAPER NUMBER		
2893				
NOTIFICATION DATE		DELIVERY MODE		
11/15/2010		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

Application No.

10/077,554

Applicant(s)

COBBLEY ET AL.

Examiner

HOA B. TRINH

Art Unit

2893

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 6/25/10.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-11, 16, 17, 19, 21-32, 34-37, 44-53, 55-76 and 85-88 is/are pending in the application.
- 4a) Of the above claim(s) 19, 21, 22, 25-27, 29-32, 36 and 51-53 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11, 17, 23, 24, 28, 34, 35, 37, 44-50, 55-76 and 85-88 is/are rejected.
- 7) ☒ Claim(s) 16 and 28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. This application contains claims 19, 21-22, 25-27, 29-32, 36, 51-53 drawn to an invention nonelected with traverse in the reply filed on 10/06/2005. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

### **Claim Rejections - 35 USC § 102**

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

An anticipation under 35 U.S.C. 102(b) or 102(c) is established when a single prior art reference discloses, either expressly or under principles of inherency, each and every element of

a claimed invention. See *RCA Corp. v. Applied Digital Data Systems, Inc.*, 730 F.2d 1440, 221 USPQ 385 (Fed. Cir. 1984).

It is well settled that the law of anticipation does not require that the reference teach what appellant is teaching or has disclosed, but only that the claims on appeal "read on" something disclosed in the reference, i.e., all limitations of the claims are found in the reference. See *Kalman v. Kimberly Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1083). Moreover, it is not necessary for the applied reference to expressly disclose or describe a particular element or limitation of a rejected claim word for word as in the rejected claim so long as the reference inherently discloses that element or limitation. See, for example, *Standard Havens Products Inc. v. Gencor Industries Inc.*, 953 F.2d 1360, 21 USPQ2d 1321 (Fed. Cir. 1991).

2. Claims 1-2,10-11,17,24,37,34-35,44-47,46, 49-50, 62-65,68-69,70,73-74,75-76,85-88 are rejected under 35 U.S.C. 102(b) as being anticipated by Johnson (5,888,849).

As to claim 1, in figure 4 and column 3, Johnson discloses a semiconductor device comprising:

a substrate 1; and a plurality of molded plastic stiffener components 3 attached to a first surface of the substrate 1 without an adhesive element, the stiffener components 3 effective to increase rigidity of the substrate, wherein the substrate and the stiffener components are separate components that are attached and secured together.

As to claims 2,37, in figure 4 Johnson discloses the substrate 1 is selected from a group consisting of polyimide layer.

As to claims 10, 68, in figure 4 Johnson discloses the stiffener components 3 comprise a thermosetting polymeric material (col. 2, lines 54-55)..

As to claim 11, in figure 4 Johnson discloses the thermal coefficient of expansion of the stiffener components and the substrate correspond such that heating expands both the stiffener components and the substrate approximately equally (col. 2, lines 48-55).

As to claim 17, in figure 4 Johnson discloses the stiffener components 3 are in a form selected from the group consisting of a grid, a lattice, a grille, and a web.

As to claim 24, in figure 4 Johnson discloses a semiconductor device comprising: a substrate 1 comprising a first surface, a second surface, and a periphery; and a plurality of molded plastic stiffener components 3 attached to the first surface of the substrate proximate the

periphery; the stiffener components 3 attached to the substrate without an adhesive element, wherein the substrate and the stiffener components are separate components that are attached and secured together (col. 3).

As to claim 34, in figure 6, Johnson discloses a semiconductor assembly comprising: a substrate 1 having a first surface, a second surface, and a periphery; a die 6 situated on the first surface of the substrate; and a plurality of molded plastic stiffener-components 3 attached to the first surface of the substrate without an adhesive element, wherein the substrate and the stiffener components are separate components that are attached and secured together.

As to claim 35, Johnson discloses in figure 6 the stiffener components 3 are situated at the periphery of the substrate.

As to claims 44, 62, 63, 73, 74, in figure 3 and columns 2-3, Johnson discloses a method of securing a stiffener to a substrate, comprising:

applying a stiffener material onto a first surface of a substrate to form a plurality of plastic stiffeners 3 proximate a periphery of the substrate 1; and

hardening the stiffener material wherein the plurality of plastic stiffeners 3 are attached to the substrate without an adhesive element, and the substrate 1 and the plastic stiffeners stiffener components 3 are separate components that are attached and secured together and mounting a die 6 on the substrate 1 (col. 2, lines 25-67; and col. 3).

As to claims 45, 64, 65, 75, Johnson discloses applying the stiffener material comprises a molding process selected from the group consisting of transfer molding, injection molding (col. 2, lines 30-34).

As to claims 46, 49-50, 76, Johnson discloses applying the stiffener material comprises applying an encapsulating material to the substrate and molding the encapsulating material into said stiffeners 3 (col. 3, lines 40)..

As to claims 47, 69, 70, Johnson discloses hardening the stiffener material comprises at least one of heating the stiffener material, cooling the stiffener material, curing the stiffener material by means of a catalyst, and curing the stiffener material by exposure to radiation (col. 3, lines 41-48).

As to claim 85, in figure 4 and column 3, Johnson discloses a semiconductor device comprising: a plurality of molded plastic stiffeners 3 attached to a first surface of a substrate 1 without an adhesive element, wherein the substrate and the stiffeners are separate components that are attached and secured together.

As to claim 86, in figure 4 and column 3, Johnson discloses a semiconductor device comprising: a plurality of molded plastic stiffeners 3 in the form of a plate attached to a first surface of a substrate 1 without an adhesive element, wherein the substrate and the stiffeners are separate components that are attached and secured together.

As to claim 87, in figure 4 and column 3, Johnson discloses a semiconductor device comprising: a plurality of molded plastic stiffeners 3 in the form of strips attached to a first surface of a substrate 1 without an adhesive element, wherein the substrate and the stiffeners are separate components that are attached and secured together.

As to claim 88, in figure 4 and column 3, Johnson discloses a semiconductor device comprising: a substrate 1 with a plurality of strips of a molded plastic stiffener 3 attached to a first surface of said substrate without an adhesive element, wherein the substrate and the stiffeners are separate components that are attached and secured together.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 3-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson as applied to claim 1 above.

**Regarding claims 3-8**, Johnson discloses the invention substantially as claimed, except that the teaching of the substrate having a range of thickness of less than about 35-75 microns or that the stiffener has a thickness range of less than about 50-100 microns. However, it is well known in the art to vary the thickness of the layers in the semiconductor device. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the substrate with a specific range, as claimed, since it is a prima facie obvious

to an artisan for optimization and experimentation with a specific range of thickness because applicant has not yet established any criticality for the specific range.

*Note that normally, it is to be expected that a change in temperature, or in thickness, or in time, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller 105 USPQ233, 255 (CCPA 19553.*

1. Claims 9, 55-56, 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson, as applied to claim 1,24, 44, 48, in view of McMillan et al. (5,650,593; hereinafter as McMillan).

**As to claims 9, 55-56, 67**, Johnson discloses the invention substantially as claimed, except that the stiffener is made of thermoplastic.

McMillan discloses the stiffeners 217 comprises a thermoplastic material (col. 7, lines 30-65).

Therefore, as to claims 9, 55-56, 67, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Johnson with thermoplastic as taught by McMillan, because the material is readily available in the art. Further, it has been held to be within the general skill of an artisan in the art to select a known

material on the basis of its suitability for the intended use as a matter of obvious design choice.

In re Leshin, 125 USPQ 416.

2. Claims 36, 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson, as applied to claim 1,24, 44, 48, in view of Hofstee et al. (6,541,847; hereinafter as Hofstee).

**As to claims 36**, Johnson discloses the invention substantially as claimed, except that the stiffener is attached to a second surface of the substrate.

Hofstee discloses an analogous device having a substrate 120 (122, 123, 124) (fig. 4); and a plurality molded plastic stiffener components 125, 126 (fig.4, col. 5, lines 30-35) secured to a first surface of the substrate without attachment with an adhesive element, the stiffener components 125, 126 are to increase rigidity of the substrate 120, wherein the substrate 120 and the stiffener components 125, 126 are separate components that are attached and secured together (fig. 4) and a stiffener 129 attached to the second surface of the substrate for providing rigidity.

Therefore, as to claim 36, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Johnson with the stiffener on the second surface of the substrate, as taught by Hofstee, for the advantage as mentioned in the above

**As to claim 76**, Johnson and Hofstee teaches the substrate 1 (fig. 4) has two or more compartments for receiving dies 34 (Hofstee).

3. Claims 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson in view of Hofstee et al. (6,541,847; hereinafter as Hofstee).

**As to claims 48-50**, Johnson discloses a method of applying a stiffener material onto a first surface of a substrate to form a plurality of plastic stiffeners 3 proximate a periphery of the substrate 1; and hardening the stiffener material wherein the plurality of plastic stiffeners 3 are attached to the substrate without an adhesive element, and the substrate 1 and the plastic stiffeners 3 are separate components that are attached and secured together and mounting a die 6 on the substrate 1 (col. 2, lines 25-67; and col. 3) and encapsulating the die (col. 3, lines 39-41).

However, Johnson does not explicitly teach that the step of singulating the dies on the frame.

Hofstee discloses an analogous device having a substrate 120 (122, 123, 124) (fig. 4); and a plurality molded plastic stiffener components 125, 126 (fig.4, col. 5, lines 30-35) secured to a first surface of the substrate without attachment with an adhesive element, the stiffener components 125, 126 are to increase rigidity of the substrate 120, wherein the substrate 120 and the stiffener components 125, 126 are separate components that are attached and secured together (fig. 4). Also, Hofstee discloses at least two dies 115, 116 positioned on the first surface of the substrate 120 (fig. 4) and being singulated thereafter. It is noted that the molding process of the plastic stiffeners becomes hardening when the stiffeners are formed.

Therefore, as to claims 48-49,50, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Johnson with the dies on the frame and then singulating them into individual die, as taught by Hofstee, for reducing packaging cost. Also, it would have been obvious to an artisan to singulate the assembly to

separate the two dies because it is well known in the art to singulate the assembly so as to separate the dies.

As to claim 62, MacDonald as modified by Hofstee discloses a method of forming a substrate 120 (fig. 4) and molding a plastic material onto a first surface of the substrate 120 (fig. 4) proximate a periphery of the substrate to form a plurality of stiffeners 125, 126 (fig. 4) on the first surface of the substrate, wherein the stiffeners 125, 126 and the substrate 120 are separate components.

As to claim 63, MacDonald as modified by Hofstee discloses a method of forming a substrate 120 (fig. 4) and molding a plastic material onto a first surface of the substrate 120 (fig. 4) proximate a periphery of the substrate to form a plurality of stiffeners 125, 126 (fig. 4) on the first surface of the substrate, wherein the stiffeners 125, 126 and the substrate 120 are separate components and that the stiffeners are inherently hardened when attached onto the substrate without adhesive element.

4. Claims 66, 69-71, 76, are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson, as applied to claim 1,24, 44, 48, above, in view of McMillan et al. (5,650,593; hereinafter as McMillan).

**As to claims 66, Johnson** discloses the invention substantially as claimed, except spray molding process.

McMillan discloses an analogous device and method. McMillan discloses the molding of the stiffeners 217 on the substrate 12, wherein the stiffeners are formed from injection, transfer or spraying molding and then curing the molding material by cooling it for hardening (McMillan, col. 7, lines 30-65).

Therefore, **as to claim 66**, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Johnson with the spray molding process, as taught by McMillian, for attaching the stiffeners to the substrate.

**As to claims 69-70**, McMillian discloses the heating and cooling of the plastic molding material for hardening (col. 7, lines 30-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the molding process to form the stiffeners, as taught by McMillian, for attaching the stiffeners to the substrate.

**As to claim 71**, although Johnson does not teach the catalyst and the heating step process of the plastic material, McMillian discloses the heating and curing of the plastic molding material for hardening (col. 7, lines 30-65) that inherently includes a catalyst in the plastic material. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Johnson with the plastic catalyst and the heating and curing step of the plastic material to form the stiffeners, as taught by McMillian, for attaching the stiffeners to the substrate.

**As to claim 76**, Johnson and McMillan teaches the substrate 12 (fig. 3) has two or more compartments for receiving dies 34 (McMillan, fig. 3).

5. **Claims 23, 60** are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson, as applied to claim 1, in view of Gregory (4,710,419).

- a. Johnson discloses the invention substantially as claimed, except that the substrate is in a form of a reel.
- b. Gregory discloses a substrate 30 is in a form of a reel (figs. 2-7).

Therefore, **as to claim 23**, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the substrate of MacDonald in view of Hofstee with the form of a reel, as taught by APA, for easy packaging.

**As to claim 60**, MacDonald in view of Hofstee and Gregory teaches the substrate comprises a leadframe 31 (Gregory, figs.2-7) for reducing cost.

#### ***Allowable Subject Matter***

6. Claims 16, 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
7. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose or fairly suggest either in singly or in combination a device having among other elements, the stiffeners comprise at least one cross member.

#### ***Response to Arguments***

Applicant's arguments filed 6/25/10, have been fully considered but they are moot in view of the new rejection.

#### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
  - c. Sathe (6,903,278) discloses molded stiffeners 1390 (fig. 13) on a substrate..

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to (Vikki) Hoa B. Trinh whose telephone number is (571) 272-1719. The Examiner can normally be reached from Monday-Friday, 9:00 AM - 5:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Ms. Davienne Monbleau, can be reached at (571) 272-1945. The office fax number is 571-273-8300.

Any request for information regarding to the **status** of an application may be obtained from the **Patent Application Information Retrieval (PAIR) system**. Also, status information for published applications may be obtained from either Private PAIR or Public Pair. In addition, status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. If you have questions pertaining to the Private PAIR system, please contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Lastly, paper copies of cited U.S. patents and U.S. patent application publications have ceased to be mailed to applicants with Office actions since June 2004. Paper copies of foreign patents and non-patent literature will continue to be included with office actions. These cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site ([www.uspto.gov](http://www.uspto.gov)), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy.



Art Unit: 2893

Requests to restart a period for response due to a missing U.S. patent or patent application publications will not be granted.

/(Vikki) Hoa B Trinh/

Examiner, Art Unit 2893